CLAIMS

1. A method for making a packaged integrated circuit (IC) comprising:
forming a heat spreader in a sheet of thermally conductive material;
attaching an IC die in a die up configuration to the heat spreader at a first location of the heat spreader;
singulating the heat spreader with the attached IC die from a remaining portion of the sheet wherein the heat spreader extends to at least a portion of an edge of the packaged IC.

2. The method of claim 1 wherein the forming the heat spreader further includes:
forming a plurality of wire bond windows in the heat spreader located between the first location and an outer portion of the heat spreader.

3. The method of claim 2 wherein forming the wire bond windows further includes forming at least five thermal connection structures thermally coupling the first portion of the heat spreader with the outer portion of the heat spreader, each thermal connection structure defining at least a portion of a wire bond window of the plurality of wire bond windows.

4. The method of claim 1 wherein the forming the heat spreader further includes forming singulation slots in the sheet around an outer portion of the heat spreader, at least portions of the singulation slots being defined by portions of an edge of the outer portion of the heat spreader.

5. The method of claim 1 further comprising:

reducing the thickness of the sheet at a location at an edge of the heat spreader;

wherein the singulating the heat spreader with the attached IC die from a remaining portion of the sheet further includes cutting the sheet at the location at the edge of the outer portion.

6. The method of claim 1 further comprising:

encapsulating the IC die attached to the heat spreader, the encapsulating further including placing a mold die against the sheet including against the heat spreader at a location near the edge of the heat spreader.

7. A packaged integrated circuit (IC) comprising:

an IC die;

a heat spreader, the IC die thermally coupled to the heat spreader at a first location of the heat spreader in a die up configuration, the heat spreader extends to at least a portion of an edge of the packaged IC.

8. The packaged IC of claim 7 wherein the heat spreader defines a wire bond window located between the first location and an outer portion of the heat spreader.

9. The packaged IC of claim 8 further comprising:

a wire bond extending from a die bond pad on the IC die into the wire bond window to a wire bond finger.

10. The packaged IC of claim 9 wherein the IC die is located at a first planar side of the heat spreader, wherein the wire bond finger is attached to a flex tape that is attached to a second planar side of the heat spreader opposite the first planar side.

11. The packaged IC of claim 7 wherein the heat spreader includes a copper sheet having defined windows, the sheet extends out to at least a portion of the edge of the packaged IC.

12. The packaged IC of claim 7 further comprising:

a plurality of balls located at a planar side of the package at a first planar side of the heat spreader, wherein the IC die is located at a second planar side of the heat spreader opposite of the first planar side of the heat spreader.

13. The packaged IC of claim 7 wherein the heat spreader further defines a plurality of wire bond windows located between the first location and an outer portion of the heat spreader, the heat spreader further including at least five thermal connection structures thermally coupling the first location with the outer portion, each thermal connection structure defining at least a portion of a wire bond window of the plurality of wire bond windows.

14. The IC package of claim 7 wherein the heat spreader includes copper.

15. A method for making a packaged integrated circuit (IC) comprising:

forming a heat spreader in a sheet of thermally conductive material, wherein the forming includes reducing the thickness of the sheet at a location at an edge of the heat spreader;

attaching an IC die to the heat spreader at a first location of the heat spreader;

singulating the heat spreader with the attached IC die from a remaining portion of the sheet, wherein the singulating further includes cutting the sheet at the location at the edge of the heat spreader.

16. The method of claim 15 wherein the reducing the thickness of the sheet further includes etching a portion of the sheet at the location at the edge.

17. The method of claim 16 wherein the etching a portion of the sheet further includes etching a first planar side of the sheet at the location and not a second planar side of the sheet at the location, wherein the first planar side is opposite the second planar side.

18. The method of claim 17 wherein the die is attached to the heat spreader at a second planar side of the sheet.

19. The method of claim 15 wherein the reducing the thickness of the sheet further includes coining a portion of the sheet at the location at the edge.

20. The method of claim 15 wherein the forming a heat spreader further includes forming a first singulation slot in the sheet and forming a second singulation slot in the sheet generally orthogonal with respect to the first

singulation slot, wherein the location extends from the first singulation slot to the second singulation slot.

21. The method of claim 15 wherein the edge of the heat spreader includes four sides, wherein the location at the edge of the heat spreader is located along at least a majority of a side of the four sides.

22. The method of claim 15 wherein:

the forming a heat spreader in the sheet further includes forming a plurality of heat spreaders in the sheet;

wherein the reducing the thickness of the sheet at a location at an edge of the heat spreader further includes reducing the thickness of the sheet at a plurality of locations with each location of the plurality at an edge of two adjacent heat spreaders of the plurality of heat spreaders;

wherein the attaching an IC die to the heat spreader further includes attaching each of a plurality of IC die to each of the plurality of heat spreaders at a first location of the each of the heat spreader;

encapsulating at least a portion of a first side of the sheet including encapsulating the plurality of IC dies in an encapsulate;

wherein the singulating the heat spreader with the attached IC die from a remaining portion of the sheet further includes singulating the plurality of heat spreaders with an attached IC die of the plurality of IC die, wherein the cutting the sheet at the location at the edge of the heat spreader further includes cutting the sheet of at the plurality of locations and cutting the encapsulate at locations above the plurality of locations.

23. The method of claim 15 wherein the location is at a corner of the heat spreader.

24. The method of claim 23 wherein the reducing the thickness of the sheet at the location at the edge of the heat spreader further includes reducing the thickness of the sheet at a plurality of locations at the edge wherein each location of the plurality is at a corner of the heat spreader.

25. The method of claim 15 wherein:

the sheet has a strip form, the strip form having a length and a width;

the forming a heat spreader in a sheet further includes forming a plurality of heat spreaders in the sheet along the length of the sheet in a one deep configuration along the width.

26. A packaged integrated circuit (IC) comprising:
an IC die;
a heat spreader, the IC die thermally coupled to the heat spreader, the heat spreader including a sheet of thermally conductive material, an edge portion of the sheet being located at a portion of an edge of the packaged IC, the edge portion having a thickness which is less than a thickness of other portions of the sheet located at an interior of the packaged IC.

27. The packaged IC of claim 26 wherein the edge portion is located at a corner of the packaged IC.

28. The packaged IC of claim 26 wherein the edge portion is located along at least a majority of a side of the packaged IC.

29. A sheet of thermally conductive material comprising:
a plurality of unsingulated heat spreaders formed in the sheet;
a plurality of locations in the sheet having a reduced thickness, wherein each of the locations is at an edge of an unsingulated heat spreader of the plurality of unsingulated heat spreaders.

30. The sheet of claim 29 wherein each of the locations is located at a corner of an unsingulated heat spreader of the plurality of unsingulated heat spreaders.

31. The sheet of claim 29 wherein each of the locations is located along at least a majority of a side of an unsingulated heat spreader of the plurality of unsingulated heat spreaders.

32. A packaged integrated circuit (IC) comprising:
an IC die;
a heat spreader thermally coupled the heat spreader, the heat spreader including an extension that extends out from a planar side of the heat spreader;
a plurality of solder balls thermally and electrically attached to a surface of the extension.

33. The packaged IC of claim 32 further comprising:
a layer of tape attached to portions of the planar side of the heat spreader, the layer of tape defining a window, the extension located in the window.

34. The packaged IC of claim 33 further comprising
A second plurality of balls attached to the tape, wherein the second plurality of balls is coplanar with the plurality of balls.

35. The packaged IC of claim 32 wherein the IC die is located at a second planar side of the heat spreader at a first location, the second planar side is opposite the first planar side, wherein the extension includes at least a portion located under the first location.

36. A method for making a packaged integrated circuit (IC) comprising:
forming a heat spreader in a sheet of thermally conductive material;
wherein the forming includes forming an extension that extends from a planar side of the heat spreader, wherein the extension is formed

by reducing the thickness of the sheet at least at locations adjacent to the extension;

attaching an IC die to the heat spreader.

37. The method of claim 36 wherein the reducing the thickness further includes etching the sheet at least at locations adjacent to the extension.

38. The method of claim 36 further comprising:

soldering a plurality of balls to the extension.

39. The method of claim 36 wherein the IC die is attached to a second planar side of the heat spreader at a first location, wherein the second planar side is opposite the planar side, wherein at least a portion of the extension is located under the first location.